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THE EFFECT OF HISTAMINE ON RESISTANCE TO ALTITUDE ANOXIA

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Experimental data accumulated by a number of investigators indicate that histamine plays an important role in the organism whenever sudden changes in the environment take place. These changes do not have to be very drastic; the human body develops histamine when the feet have been placed into cold or warm water. In view of the fact that histamine is developed subsequent to injuries, some authors ascribe to it an important role in inducing the shock which follows these injuries. Many investigators regard histamine as a pathogenetic factor which injures remote organs or the whole organism.

In the course of work done during 1949-1951, Czechoslovak investigators established that histamine accelerates the tyroxin-induced metamorphosis of tadpoles, while substances which have an antihistaminic effect (e.g., Antihistaminicum Spofa III-101) suppress this metamorphosis. During the same period, other Czechoslovak investigators made a study of the action of histamine from the standpoint of this substance's interference with metabolic processes. The results of their work demonstrated that histamine exerts a direct effect on metabolism. Thus, histamine accelerates the growth of bacteria in a glucose medium without producing an increased consumption of either oxygen or glucose by these bacteria. This indicates that histamine supplies energy needed for protein metabolism by means of an anaerobic mechanism which has not yet been investigated adequately. It is assumed that histamine has an influence on phosphoric acid metabolism. This metabolism is closely connected with the processes of anaerobic respiration and morphogenesis.

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In the light of the results outlined above, it seemed important to establish in just what manner histamine affects the basal metabolism of mammals and furthermore whether it can partly and temporarily replace oxygen. With this aim in view, the resistance of animals (mice) to brief anoxia produced at high altitudes (8500-12,000 meters) was determined.

The results indicate that histamine on being administered subcutaneously to mice increases their resistance to altitude anoxia. Furthermore, histamine suppresses the convulsions that are produced in mice by anoxia. As a result of the action of histamine, these convulsions become weaker and appear at a lower barometric pressure as compared with pressures at which convulsions are observed in control mice. Mice which have been subjected to anoxia twice exhibit an increased resistance. The increased resistance to anoxia reaches a maximum within 30 minutes after the original exposure and drops to a partically normal level 2 hours after this exposure.

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